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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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SMITH GAMBRELL & RUSSELL LLP
BEVERIDGE DEGRANDI
WEILACHER & YOUNG INTELLECTUAL PROPERTY
1850 M STREET NW SUITE 800
WASHINGTON, DC 20036

EXAMINER	
AFTERGUT, JEFF H	
ART UNIT	PAPER NUMBER
1733	24

DATE MAILED: 07/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/453,055	YAMAGUCHI ET AL.	
	Examiner	Art Unit	
	Jeff H. Aftergut	1733	

-- The MAILING DATE of this communication appears on the cover she t with the correspondence addr ss --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,10 and 16-23* is/are pending in the application.

4a) Of the above claim(s) *19-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2, 10, 16-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Amendments

1. The applicant is advised that in the future all claim amendments must show the changes made in the claim with underlining in the additions and brackets in the deletions. It should be noted that claim 19 as presented in the preliminary amendment does not include such underlining and bracketing as the previously submitted amendment after final has not been entered. For purposes of examination, the amendment has been treated as the claims appear in the preliminary amendment dated 6-2-03.

Election/Restrictions

2. Newly submitted claims 19-23 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: As discussed in paper no. 6, the species of short glass fibers or nonwoven fibers was mutually exclusive of the species for use of the glass microballons (glass spheres) and as such the applicant has elected by original presentation the use of glass microballons.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 19-23 have been withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 2, 10, 16-18 are rejected under 35 U.SC. 103(a) as being unpatentable over Cundiff in view of Lubin (the portion from the "Handbook of Composites"), Fellman et al, Ahrens et al, Browne et al and E.P. 588,436.

Cundiff et al taught a process for forming a honeycomb sandwich composite panel comprising the steps of stacking dry fabric 18a, 18b on both sides of a honeycomb core 12 with a thermosetting sealing material (14a, 16a, 14b, 16b) having an adhesive property there between, heating the assembly at the curing temperature of the sealing material (the adhesive films 14a and 14b as well as the prepreg material 16a and 16b) to cause the sealing material to harden, see column 4, lines 4-8 and column 8, lines 64-column 9, line 7, for example, impregnating the dry fabric with a thermosetting resin, see column 4, lines 8-11 and column 9, lines 8-22, and curing the resin of the resin impregnated dry fabric by hot pressing the entire assembly, see column 4, lines 11-14, column 9, lines 23-30. The reference taught the regulation of the temperature during the processing in order to allow for the curing of the resin of the film and the prepreg layer and varied (reduced) the same prior to introduction of the impregnating resin for the dry fiber on the exterior of the assembly in the resin transfer molding operation. The reference failed to make mention of the use a sealing material, however the ultimate purpose of the resin layers 14a, 14b as well as the prepreg layers 16a and 16b was to seal off the core such that the core remained hollow after the RTM operation. Thus, in the reference to Cundiff, the sealing material was the combination of the layers 14a and 16a on the one side and 14b and 16b on the other. The reference to Cundiff et al suggested that after the layers 14a, 14b, 16a, 16b were cured the temperature of the mold was lowered in order to prepare the same for impregnation and RTM.

Cundiff et al failed to teach that the sealing layer would have included microspheres of glass therein in the same. However, it was known at the time the invention was made to utilize glass microspheres within resin layers in order to impart stiffness to the material at a reduction in weight and cost relative to the prepreg layers of material and the formation of a laminate of several layers of prepreg material with the glass microspheres was known in the art as useful in the manufacture of aircraft laminate as evidenced by Fellman et al, Ahrens et al and Brown et al.

Fellman et al suggested that those skilled in the art would have understood that syntactic foam layers (which was a layer of thermosetting resin with glass microspheres or microballoons therein) would have been a well known replacement for prepreg layers which were less expensive and yet provided the requisite stiffness needed to make the laminate. Additionally, the reference suggested that those skilled in the art would have known that the resin layers which contained the microspheres would have been laminated alternatively between reinforcement to form the laminates with increased stiffness. To further evidence the same, the reference to Ahrens et al is cited. Note that in Ahrens et al the thermosetting resin with the microspheres therein was formed into a prepreg and then laminated with two prepreg layers there between in the formation of the composite article. The reference suggested that such composites would have been useful in aircraft structures (note that Cundiff et al was assigned to Boeing and that the panel formed therein was clearly useful in an aircraft). The reference to Browne et al suggested that the inclusion of a glass microsphere resin layer in a composite would have increased the composites impact resistance and the syntactic foam material employed in the operation conventionally included a scrim layer therein. The reference to Browne made it clear that those skilled in the art would have understood that the desirability of providing glass microspheres

within a layer of the sealing material in order to note only increase the stiffness of the composite panel but also to increase the impact resistance of the same.

While it is believed as evidenced above that one skilled in the art at the time the invention was made would have incorporated glass microspheres within the sealing layer for the reasons identified above, none of the references taught or suggested that the incorporation of the microspheres within the layer would have resulted in a layer having improved viscosity properties (i.e. that the microspheres would have been added to enhance the flow characteristics of the resin film layers). It should be pointed out that the reason for making the combination need not be applicant's specific reason and that a prima facie case has been established once there is motivation for making the combination regardless of whether the reason for making the combination was the same reason as applicant's or not, see In re Lintner, 173 USPQ 360, In re Shetty, 195 USPQ 753, In re Hoch, 166 USPQ 406 and In re Wilder, 166 USPQ 545. The reference EP '437 is cited to show that those skilled in the art at the time the invention was made would have readily appreciated that microspheres would have been added in resin layers in order to regulate the viscosity of the resin layer during processing and render the resin film more like a prepreg layer. More specifically, the applicant is referred to pages 2-3 of EP '437 (and the discussion of Syncore® therein). Additionally, the applicant is more specifically referred to page 2, lines 46-55 where the flow of the resin film including the microspheres is discussed in EP '437. The applicant is also referred to page 7, lines 25-32 for a discussion of the use of Syncore® with honeycomb layers and the discussion of the scrim layer therein. Clearly, one skilled in the art of composite manufacture desiring a more rigid and stiff panel would have been led to incorporate microspheres within the resin films of Cundiff. Additionally, the incorporation

of the glass microspheres within the resin films of Cundiff et al would have been obvious to one of ordinary skill in the art at the time the invention was made where the sealing resin layers included a plurality of glass microspheres as taught by Fellman et al, Ahrens et al and Browne et al for the purpose of increasing the stiffness of the panel at a reduced cost as well as increasing the impact resistance of the panel and wherein incorporation of such microspheres within the resin layers would have controlled the flow properties of the resin film to better correspond to that of a prepreg layer as suggested by E.P. 588,437.

Note that Cundiff et al failed to expressly state that the prepreg layers were ones which were formed from thermosetting resin. As set forth in paper no. 4, the use of the uncured adhesive films 14a, 14b, as well as the use of uncured prepreg layers 16a, 16b were taken as thermosetting sealing material. The applicant has argued that such materials are not thermosetting. However, as set was notoriously well known in the art of adhesives, material which cured during bonding was a thermosetting material. It should be noted that to further evidence the same the glossary from the "Handbook of Composites" from Lubin is cited herein. This is not a new ground of rejection; rather the reference to Lubin is cited to show factually that a curable material is in fact thermosetting. In particular, the applicant is referred to the definition of thermoset and cure where when one cured, one changed the properties of the resin with the action of heat or pressure (or both) and where one would have understood that a thermoset resin was a plastic which "when cured" changed into a substantially infusible state. Additionally, the definition of prepreg states that the resin is usually in a "B-stage" and the definition of "B-stage" made it clear that this stage in the curing process was applicable to thermosetting resins. Clearly, the uncured film and the uncured prepreg of Cundiff were indeed thermosetting resins which

were not yet completely cured. The applicant is additionally advised as addressed in paper no. 4 that the film and prepreg of Cundiff clearly prevented the resin used to impregnate the dry perform in the resin transfer molding operation from penetrating into the cells of the honeycomb and as such were clearly sealing materials, see column 7, lines 14-26, for example. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the techniques of Cundiff to form a honeycomb assembly which included a core which was left unfilled with resin wherein the same was achieved with sealing films of resin which were used to attach the perform to the core prior to impregnation wherein these uncured films were well recognized as thermosetting as evidenced by Lubin wherein one incorporated glass microspheres within the resin layers in order to impart stiffness to the finished product as well as to better control the flow properties of the resin films as suggested by Fellman et al, Ahrens et al, Browne et al and E.P. 588,437.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a composite panel with resin impregnated reinforced facings as suggested by Cundiff. As to the particular techniques used to produce the glass microballoons within the sealing layers, the applicant is advised that the prepreg layers described above would have constituted a resin film and that the glass microspheres were disposed between the same. Additionally, the references suggested that alternating layers of the prepreg material with the glass microspheres would have been known. Additionally, note that the reference to Browne suggested that the microsphere layer would have included a scrim therein (a carrier layer). A similar teaching may be found in EP '437. Note that the temperature ranges defined by Cundiff

were such that the adhesive of the sealing layers would have been capable of curing at a temperature less than the temperature that one performed RTM as defined.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 2, 10, and 16-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 2, line 2, the applicant recites that the process is one "consisting of" the following steps. The applicant additionally recites on line 5 of the claim 2 that the resin film is one "including glass microspheres". The applicant is advised that the claimed process does not require the exclusion of glass fibers in the sealing layer, just that the sealing layer includes glass microspheres. The applicant HAS NOT excluded the incorporation of prepreg layer in the sealing layer, just that the sealing layer must include glass microspheres. The language "consisting of" in the preamble of the claim appears to limit the order of steps performed but does not exclude additional materials as at line 5 of the claim the applicant has chosen to use the language "including glass microspheres". It is unclear whether the broader language should be included in the narrower claim and exactly what the requirements for the sealing layer are in the claim.

Response to Arguments

7. Applicant's arguments filed 6-2-03 have been fully considered but they are not persuasive.

The applicant argues that the claim (claim 2) has excluded the use of glass fibers therein and that the references to Fellman et al, Ahrens et al, Browne et al and E.P. 588,437 all incorporated prepreg (glass fiber) layers with the glass microsphere layers while the reference to Cundiff clearly required the use of prepreg layers therein. As noted above, it is not clear whether the claims at hand have completely excluded the use of prepreg layers within the sealing layer. Additionally, as previously noted, the prior art repeatedly suggested why those skilled in the art would have incorporated glass microsphere layers instead of the prepreg layers in Cundiff as expressed by each of Fellman et al, Ahrens et al, Browne et al and E.P. 588,437. the reason for such a substitution was the reduction in cost associated with the use of the syntactic foam (SynCore) and the increase in structural rigidity associated with the incorporation of the same in place of prepreg layers. The references, while each suggesting combinations with other prepreg and/or honeycomb layers (see E.P. '437) clearly envisioned that the use of the SynCore was an alternative material suitable for substitution instead of prepreg in composite article manufacture. It should be noted that in Cundiff the exterior dry fabric which was later impregnated with RTM clearly provided a fiber reinforced resin impregnated layer adjacent what would be the SynCore layer (subsequent to the substitution of the Syncore for the prepreg layers in Cundiff). It should be noted that where, as here, two equivalents were known for their desired function, an express suggestion of the substitution of one for the other is not needed to render such substitution obvious, see In re Fout, 213 USPQ 532, In re Siebentritt, 152 USPQ 618. clearly, one skilled in the art viewing the references to Fellman et al, Ahrens et al, Browne et al and E.P. 588,437 would have readily appreciated the obvious advantages of the use of SynCore materials in place

of prepreg materials in the manufacture of the honeycomb core assembly of Cundiff and would have incorporated the same in the process.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff H. Aftergut whose telephone number is 703-308-2069. The examiner can normally be reached on Monday-Friday 6:30-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on 703-308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jeff H. Aftergut
Primary Examiner
Art Unit 1733

JHA
July 7, 2003